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EXAMINER
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MAHMOUDI, HASSAN

ART UNIT	PAPER NUMBER
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2165

DATE MAILED: 02/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/728,147

Applicant(s)

NADJ ET AL

Examiner

Tony Mahmoudi

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

  
**SAM RIMELL**  
**PRIMARY EXAMINER**

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Remarks***

1. In response to communications filed on 15-October-2004, the specification of the disclosure has been amended to overcome previous objections. Also, claims 1-4, 6, and 8-10 have been amended and new dependent claims 13-15 have been added per applicant's request. Therefore, claims 1-15 are presently pending in the application.

### ***Claim Objections***

2. Claims 4-5 are objected to because of the following informalities in the claims:

Claim 4 in lines 2-3 recites "reading a children". Applicant is requested to replace the above phrase with either --reading a child node--, or, --reading children nodes--. Appropriate correction is required.

Claim 5 is objected to because it is a dependent from the objected to dependent claim 4.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 1-8, 11 and 13-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Rathbun (U.S. Patent No. 6,138,123.)

As to claim 1, Rathbun teaches a data structure (see column 3, lines 50-53), comprising:

a root level having a node group, the node group having k number of nodes (see figure 9, where "root level node" is depicted as "A", and "k number of nodes" is depicted as "B and G nodes"; and see column 19, lines 55-57), each of the k number of nodes sharing a pointer (see figure 9, where nodes B and G are pointing to root level node A), each of the k number of nodes stored contiguously in memory (see column 4, lines 20-51, see column 5, lines 4-6, and see column 37, line 6 through column 38, line 49);

a second level having one supernode (see figure 9, where "supernode" is depicted as node G), the supernode having k number of node groups (see figure 9, where "node groups" is illustrated as nodes C and H), each of the k number of node groups includes k nodes (see figure 9, where "k nodes" is depicted as nodes F and I), the k nodes of the supernode being stores contiguously in memory (see column 4, lines 20-51, see column 5, lines 4-6, and see column 37, line 6 through column 38, line 49),

wherein the pointer references the contiguously stored k nodes of the supernode (see figure 9.)

As to claim 2, Rathbun teaches the structure further comprising a hole as a k node, the hole representing an absent value (see column 8, lines 62-65, where “hole representing absent value” is read on “empty” node.)

As to claim 3, Rathbun teaches wherein the k number of node groups are siblings of each other, such that only one sibling node is needed for any given path (see figure 65, and see column 11, lines 34-37.)

As to claim 4, Rathbun teaches wherein the arrangement of the supernode allows for speculatively reading children before an exact desired child node is known (see column 19, lines 55-57, where “reading children node before an exact child is known” is read on “moving right, traveling down, locating 50 and 70 in order to insert 60” as a child.)

As to claim 5, Rathbun teaches wherein the determination of the exact desired child proceeds in parallel with the retrieval of the supernode (see column 4, lines 21-29.)

As to claim 6, Rathbun teaches the structure further comprising a third level having k number of supernodes (see figure 27, where the “third level having k

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number of supernodes” is illustrated as node H), each of the k number of supernodes of the third level having k number of node groups (see figure 27, node groups F and I), each of the k number of node groups include k nodes (see figure 27, “nodes 71-78 and 90-max”), wherein the k number of supernodes of the third level are referenced to the second level by k pointers associating each one of the k number of node groups of the second level to a corresponding one of the k number of supernodes of the third level (see figure 27.)

As to claim 7, Rathbun teaches the structure further comprising a remove or delete operation which does not require a last value to be moved into a root node (see figures 9, 10, and 27, and see column 6, lines 49-63, where “remove or delete operation” is read on “remove() function”).)

As to claim 8, Rathbun teaches wherein the remove or delete operation comprises: removing a value from the root node (see column 8, lines 1-10); and percolating the hole associated with the removal of the value from the root node (see column 7, lines 58-67, where “removal” based on “position” and “value” is discussed) down the data structure (see column 8, lines 11-15, where “re-ordering data structure” is discussed.)

As to claim 11, Rathbun teaches the structure further comprising an insert operation for percolating a value to be inserted starting at the root level and

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proceeding towards the bottom level (see figures 4-6, and see column 6, lines 49-63, where “insert operation” is read on “insert() function”.)

As to claim 13, Rathbun teaches wherein an insert operation and a remove operation access the data structure in a top-to-bottom order (see column 7, lines 32-67.)

As to claim 14, Rathbun teaches the data structure further comprising:  
a first level memory storing the root level node group; and  
a second level memory storing the second level supernode, wherein the first level memory and the second level memory may be accessed simultaneously (see column 4, lines 20-29, see column 9, lines 61-67, where “parallel processing on multiple processors” is discussed, see column 15, lines 15-31, and see figure 66 and column 37, lines 19-44.)

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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6. Claims 9-10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rathbun (U.S. patent No. 6,138,123) in view of Klayman (U.S. patent No. 5,463,389.)

As to claim 9, Rathbun does not teach wherein the data structure contains a hole counter that counts a number of holes below the pointer, the hole counter being associated with the pointer, the hole counter representing the number of holes in the supernode below the pointer.

Klayman teaches a data compression method and device utilizing children arrays (see Abstract), in which he teaches wherein the data structure contains a hole counter that counts a number of holes below the pointer (see column 3, lines 49-53, and see column 6, lines 10-19), the hole counter being associated with the pointer (see column 6, lines 53-62, and see column 11, line 62 through column 12, line 1), the hole counter representing the number of holes in the supernode below the pointer (see column 8, lines 64-67, where “representing the number of holes in the supernode” is read on “child counter is set to a value signifying an empty children array at that node”).)

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Rathbun to include wherein the data structure contains a hole counter that counts a number of holes below the pointer, the hole counter being associated with the pointer, the hole counter representing the number of holes in the supernode below the pointer.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Rathbun with the teaching of Klayman,



because wherein the data structure contains a hole counter that counts a number of holes below the pointer, the hole counter being associated with the pointer, the hole counter representing the number of holes in the supernode below the pointer, the system can show the number of empty/available cells within the children arrays so that they may get filled with appropriate children of the same root via the insertion operation.

As to claim 10, Rathbun does not teach wherein the remove operation comprises incrementing the hole counter associated with the pointer when the pointer is traversed.

Klayman teaches a data compression method and device utilizing children arrays (see Abstract), in which he teaches wherein the remove operation comprises incrementing the hole counter associated with the pointer when the pointer is traversed (see column 3, lines 45-53, where “incrementing the hole counter” is read on “decrementing the child counter of the node”).)

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Rathbun to include wherein the remove operation comprises incrementing by one the hole counter associated with each pointer that is traversed.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Rathbun with the teaching of Klayman, because wherein the remove operation comprises incrementing by one the hole counter associated with each pointer that is traversed, the system can maintain an

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accurate count on empty, available, or absent cells as well as an accurate count on the number of children/leaves a root/parent node has at any point in time.

As to claim 12, Rathbun as modified teaches wherein an insert operation comprises: percolating a value to be inserted starting at the root level (see Rathbun, column 19, lines 55-67);

in the one or more pointers, each pointer being associated with a hole counter that tracks the number of available holes, percolating the add value down a node in which the hole counter contains a value greater than zero (see Klayman, column 3, lines 49-53, and see column 6, lines 10-19); and

decrementing the selected hole counter by one (see Klayman, column 3, lines 49-53.)

***Allowable Subject Matter***

7. Claim 15 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim *and* any intervening claims.
8. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record, Rathbun (U.S. Patent No. 6,138,123) and Klayman (U.S. patent No. 5,463,389), do not disclose, teach, or suggest the claimed limitations of (in combination with all other features in the claim):

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wherein each of the first level memory and the second level memory are associated with corresponding comparator blocks, the comparator blocks configured to examine hole counters representing the number of holes in the supernode, as recited in claim 15.

### ***Response to Arguments***

9. Applicant's arguments filed on 15-October-2004 with respect to the rejected claims in view of the cited references have been fully considered but they are not found to be persuasive:

In response to the applicant's arguments that "Rathbun is silent as to a pointer shared by the k number of nodes and contiguously storing the data in memory", the arguments have been fully considered but are not deemed persuasive, because Rathbun teaches the above (see column 4, lines 20-51, see column 5, lines 4-6, and see column 37, line 6 through column 38, line 49.)

In response to the applicant's arguments made with regards to the newly added claims, the arguments have been considered but are moot in view of the grounds of rejection made above.

### ***Conclusion***

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

11. Any inquiries concerning this communication or earlier communications from the examiner should be directed to Tony Mahmoudi whose telephone number is (571) 272-4078. The examiner can normally be reached on Mondays-Fridays from 08:00 am to 04:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dov Popovici, can be reached at (571) 272-4083.

tm

February 8, 2005



**SAM RIMELL**  
**PRIMARY EXAMINER**